

EDNET TERMS APPENDIX - Chapter 8

8.11. Example of Expanded Syllabus-Distance Learning Class

Course Description

Increasingly, jobs and workers are affected by modern technology. Technicians who assemble, modify, operate, troubleshoot, and repair equipment in the manufacturing and service industries are challenged by the diversity, complexity, and rapid evolution of technical equipment. Vocational -technical education has responded to the challenge and opportunity in emerging technologies by preparing students with a broad base of technical concepts and principles. Curriculum for this course was developed by the Agency for Instructional Technology and the Center for Occupational Research and Development.

Course Objectives

Students will be able to apply:

- 1) The meaning of "System" and "Subsystem."
- 2) The meaning of "Principles" when used to explain the operation of systems and subsystems.
- 3) The advantages of learning principles rather than mere descriptions or procedures of operation of systems.

Course Scope

Students will understand:

- 1) The principles of technology and the mathematics associated with them.
- 2) The four energy systems—mechanical, fluid, thermal and electrical.
- 3) The changing demands of the work force.

Course Sequence

- 1) Force
- 2) Work
- 3) Rate
- 4) Resistance

- 5) Energy
- 6) Power
- 7) Force transformers

Texts

- 1) A student text has been developed for each of the 7 units and is available from Clark & Stone Book Company, E. 202 Trent, Spokane, WA 99202, (509)838-0607.
- 2) A set of laboratory equipment is required for each group of four students. A needs assessment is available from Clark & Stone Book Company. Grant monies are available from several state departments of education.

Student Evaluation

Student assessment will occur at the end of each unit of the course sequence. Grades will be assigned by the course instructor: 90-100%=A; 80-90%=B; 70-80%=C, etc. This course is largely hands-on, and mastery learning practices are part of the instructional plan.

Screening of Prospective Students

Students who are in grades 10-12 and who are (1) in a college preparatory program, or (2) in a high school vocational program will benefit from this course.

The Principles of Technology course is a satellite-delivered class that is designed to prepare you for technical careers. The complexity and rapid change of modern technology is requiring that students understand and apply the "Principles" behind the "Technology". Today's technicians must be able to understand the mechanical, fluid, electrical, and thermal principles on which modern technology operates. If tomorrow's technicians understand these principles then they can apply them to their current work as new tasks and needs arise.

HOW THE CLASS IS TAUGHT

The satellite system will deliver a 50-minute televised program, four days a week (Monday through Thursday). A series of informative videos, discussions, math activities, and demonstrations, coupled with hands-on student lab activities and student testing will make up the school week. The fifth day will be for students to take quizzes, tests, finish

lab or math activities, etc. A site facilitator at your school will send most materials to the instructor in Spokane for grading. The site facilitator may do some grading as well.

GRADING - You will be required to:

- *Participate in class*
 - Bring your book, pencil, to class.
 - Call the instructor on the phone either before, during, or after class. I am here to work with each of you! I'll keep track of who calls. Don't be afraid to call in during the middle of class.

Complete the lab activities:

- Math labs--Yes, there is Math in our class!
- Hands-on labs-- They're fun and easy to do. They make the class interesting and relevant.
- Hand in other assignments and tests promptly. Distance learning requires that I be a little flexible in how soon I see papers and assignments. All papers (if not checked locally) are due within three days to my office. The site facilitator will keep a log of papers and materials sent and received.

Scoring

▪ Tests and quizzes.....	40%
Lab Activities.....	30%
Math Lab Activities.....	20%
Participation.....	10%

A=100%-90% B=89%-80% C=79%-70% Below 69%-Redo!

PRINCIPLES OF TECHNOLOGY-GENERAL OVERVIEW

Increasingly, jobs and workers are affected by modern technology. Technicians who assemble, modify, operate, troubleshoot, and repair equipment in the manufacturing and service industries are challenged by the diversity, complexity, and rapid evolution of the equipment. Vocational technical education must respond to the challenge and opportunity in emerging technologies by preparing students with a broad base of technical concepts and principles. The additional emphasis on technical principles should enable future workers to be more employable and flexible in the changing job

market and work force.

GENERAL CLASS GOALS

- *Students will:*
 - 1. Learn principles of technology and use the associated mathematics;
 - 2. Recognize that technicians must understand basic technical principles, that these principles apply to the mechanical, fluid, electrical and thermal energy systems found in technological devices; and
 - 3. Will develop confidence in their ability to understand and apply scientific concepts and principles.

SPECIFIC CLASS GOALS

- *Students will know:*
 - 1. The meaning of "System" and "Subsystem"
 - 2. The meaning of "Principles", when used to explain the operation of systems and subsystems.
 - 3. The advantages of learning principles rather than mere descriptions or procedures of operation of systems.

(Note: This is not a complete class goals list; it only serves as an example. The actual list was approximately five pages long.)

UNIT GOALS-Unit #1 (Note: There will be five units comprising P.O.T.)

FORCE

1. Explain the meaning of Force.
2. Technicians deal with four energy systems which are mechanical-fluid-electrical-thermal.
3. Relate how force in a mechanical, pressure in a fluidal, voltage in an electrical and temperature in a thermal system act as forces and are said to be a forcelike quantity called a "Prime Mover."
4. Give examples of complex technological devices in which force must be controlled, measured, or applied.
5. Predict what happens when an unbalanced force occurs on an object.
6. Measure force in the four systems.
7. List occupations that require technicians to measure, control, and otherwise deal with force in complex devices.

WORK

1. Describe what is meant by work in general. Then describe work in mechanical, fluid, and electrical systems.
2. Describe how work in mechanical, fluid, and electrical systems involves the presence of force and movement.
3. Identify correct SI and English units for work in the mechanical, fluid, and electrical systems.
4. Measure work in mechanical, fluid, and electrical systems.

RATE

1. Describe what's meant by rate in general. Describe rate in mechanical, fluid, electrical, and thermal systems.
2. Identify appropriate SI and English units for rate in all four of the energy systems.
3. Measure rate in all four of the energy systems.
4. Identify workplace applications where rate is measured and/or controlled.

RESISTANCE

1. Describe what is meant by resistance. Describe resistance in all four energy systems.
2. Identify appropriate SI and English units for resistance in all four of the energy systems.
3. Measure resistance and calculate appropriate units of resistance in lab activities associated with resistance.
4. Identify workplace applications where resistance is measured and/or controlled.
5. Describe two technical occupations that deal with resistance in any of the four energy systems.

POWER

1. Describe what is meant by power. Describe power in all mechanical, fluid, and electrical systems.
2. Identify appropriate SI and English units for power in the three energy systems.
3. Measure power in the three energy systems.
4. Identify workplace applications of power in all four energy systems.

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PRINCIPLES OF TECHNOLOGY WEEK 7-8

Week #7

DAY 24, MONDAY, OCTOBER 14, 1991

- Objectives
 - #1. Calibrate a liquid thermometer to indicate the temperature in Celsius.
 - #2. Measure temperature with a calibrated thermometer.

Activities

- ..Lab 1T1 (measuring temperature with thermometers)
- ..Homework~read pages 103-106

DAY 25, TUESDAY, OCTOBER 15, 1991

- Objectives
 - #1. Draw a thermocouple circuit. Explain how a thermocouple works.
 - #2. Construct an actual thermocouple circuit for temperature measurement.

Activities

- ..Demonstration of a Thermocouple
- ..Lab 1T2.
- ..Students copy page 111 for data table. Do wrap up questions on page 112.
- ..George will be videotaping Oct 21 lesson after class!

DAY 26, WEDNESDAY, OCTOBER 16, 1991

- Objectives
 - #1. Measure Celsius temperature with a thermocouple to within 2 Celsius degrees.
 - #2. Read the voltage reading of a thermocouple and determine the correct temperature from a thermocouple calibration table.

Activities

- ..Continue Lab 1T2
- ..Review Video Temperature in Thermal Systems.
- ..Review objectives of Thermal Force.

- ..Quiz on Thermal Force.
- ..Homework - read pp 113-114.

DAY 27, THURSDAY OCTOBER 17, 1991

- Objectives
 - #1. Summarize the relationships between each of the energy systems and force and force-like quantities.
 - #2. Describe a technical job that involves:
 - ..Mechanical force.
 - ..Fluid force.
 - ..Electrical force.
 - ..Thermal force (Heat is a force-like quantity!).

Activities

- ..Discussion-Summary of Force, Interrelationships between each of the energy systems and force.
- ..Video "Summary: Force" (5:23)
- ..Review of vocabulary terms
- ..Homework-Unit One exam tomorrow!

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SITE TEACHER SURVEY

(Copy this form and use to survey your schools)

Distance learning is a unique form of education. Obviously, there is a lot of technology behind the scenes, which may seem confusing. I would like to know about you, your school, your students, equipment, etc.

Classroom Coordinator_____

School Name_____City, State_____

School Phone_____Fax_____

Best time to call_____

Total number of students participating_____

Describe how you are participating:

How many kids at each grade level?_____

How much time do you have in addition to the 50-minute broadcast? Do you plan to watch "live" or "taped"?

What does your school expect from students in the amount of time outside of class to do homework?

Describe your room and facilities. A Polaroid snapshot would be nice! Be sure you are in it!

Are library facilities available to students?

Are computers available to students?

What is your teaching background?

What role do you see yourself playing in distance learning?

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STUDENT INFORMATION

(Copy this form and use to survey your students)

PLEASE COMPLETE THIS FORM. THE SITE FACILITATOR SHOULD COPY IT AND SEND THE STUDENT'S ORIGINAL TO THE INSTRUCTOR. THANKS FOR YOUR INTEREST AND HELP IN FILLING THIS OUT--IT WILL HELP ME GET TO KNOW YOU.

NAME_____AGE_____

SITE FACILITATOR_____

SCHOOL_____

SCHOOL MASCOT NAME_____

SCHOOL ADDRESS_____

CITY_____STATE_____ZIP_____

WHAT DO YOU LIKE TO DO AT SCHOOL?

WHAT DO YOU LIKE TO DO AFTER SCHOOL?

DO YOU ENJOY COMING TO SCHOOL?

WHAT DO YOU THINK OF WHEN YOU HEAR ABOUT "HIGH TECHNOLOGY"?

IS TECHNOLOGY, AS YOU UNDERSTAND IT, GOOD OR BAD? WHY?

IS THIS YOUR FIRST DISTANCE LEARNING CLASS?

WHAT DO YOU THINK ABOUT TAKING A CLASS ON TELEVISION?

WILL YOU BE WILLING TO CALL THE INSTRUCTOR, EVEN IF IT MEANS THAT YOU'LL BE HEARD ON TELEVISION BY EVERYONE?

WHAT IS THE NEATEST THING ABOUT YOU THAT YOU WOULD LIKE ME TO KNOW ?